

Congenital Genu Valgus deformity treated with osteotomy and plate osteosynthesis: A case report

To Cite:

Khan K, Dhaniwala N, Kekatpure A, Ahmed S, Awasthi A. Congenital Genu Valgus deformity treated with osteotomy and plate osteosynthesis: A case report. Medical Science, 2022, 26, ms128e2146.
doi: <https://doi.org/10.54905/dissi/v26i122/ms128e2146>

Authors' Affiliation:

¹Resident Doctor (MBBS), Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi (M), Wardha (MH), India

²Professor (MBBS, MS), Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi (M), Wardha (MH), India

Corresponding author

Resident Doctor (MBBS), Department of Orthopaedics, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi (M), Wardha (MH), India
Email: khizar.khan.khusrau@gmail.com

Peer-Review History

Received: 27 February 2022

Reviewed & Revised: 02/March/2022 to 05/April/2022

Accepted: 06 April 2022

Published: 12 April 2022

Peer-review Method

External peer-review was done through double-blind method.

URL: <https://www.discoveryjournals.org/medicalscience>



This work is licensed under a Creative Commons Attribution 4.0 International License.

ABSTRACT

Introduction: Congenital genu valgus is a well described deformity. Various treatment modalities are available such as growth modulation using hemi epiphysiodesis or epiphysiodesis and corrective osteotomy with plate osteosynthesis. The choice of correction largely depends on the skeletal age of the patient. **Case report:** In this report we describe a case of congenital genu valgus managed with corrective osteotomy and plate osteosynthesis. **Conclusion:** With adequate preoperative planning, the axis of lower limb can be restored in a patient of congenital genu valgus on treatment with corrective osteotomy.

Keywords: hemi epiphysiodesis, mechanical axis, genu valgus, corrective osteotomy

1. INTRODUCTION

The coronal plane abnormalities of the lower limbs include the genu valgus or knock knees. Physiological genu valgus starts developing in children by two years of age and the maximum deformity is expressed at three to four years of age. After that it decreases to a normal valgus position by 7 years (Greene, 1994). In abnormal genu valgus cases, leg straightening procedure such as hemi epiphysiodesis has taken the place of osteotomy as the gold standard method. However, in spite of good success rate, several complications such as implant loosening, growth plate damage and material fracture have been reported. This procedure is indicated for skeletally immature patients (Zajonz et al., 2017).

Corrective osteotomy is the procedure of choice in skeletally mature patients (Greene, 1994). Though high tibial osteotomy has been successfully used to treat varus deformities, it has been noted that tibial osteotomy could not be used for correction of valgus deformity of more than 12 degrees because correction of a larger deformity would disturb the knee joint line obliquity which will cause the femur to subluxate medially during gait. Kosashvili et al., (2010) stated that when the abnormality is more than 10-12 degrees, varus osteotomy of distal femur is the procedure of preference

although, no standard accepted guidelines for managing these deformities. The recommended modalities of management differ extensively as per case to case and surgeon's preference. In this case report, we have described how we have successfully managed a patient of valgus deformity at knee by distal femoral osteotomy and plating.

2. CASE REPORT

A 13 years old female presented with bilateral genu valgus deformity and outward deviation of legs at knee, right more than left since birth. She also complained of pain and difficulty while walking. Her parents did not give any history of developmental delay or trauma. Examination revealed valgus deformity of 20 degrees on the right side and 15 degrees on the left side (figure 1 and 2). There was no tenderness on the joint. Range of movements in both knees was 0 to 120 degrees and the valgus deformity disappeared on knee flexion, indicating the cause in femur. The patient had come to get the deformity corrected.



Figure 1 Preoperative x-rays showing valgus deformity of both knees more on right side

The patient was planned for distal femoral osteotomy with plate osteosynthesis. The goal of correction was to realign the lower limb mechanical axis while maintaining the obliquity line of knee joint. The procedures along with its complications were explained to the patient and her parents and consent was taken.

Midline parapatellar incision was taken over the anterior part of lower femur. Soft tissue dissection was done. Distal end of femur was exposed. Closed wedge medial osteotomy was done by the bone saw in the metaphyseal region of distal femur to avoid any damage to growth plate (figure 3). Deformity was fully corrected and then fixation was done laterally with a 6-hole dynamic compression plate and 5 cortical screws. Closure was done in layers. Post operatively the patient was given IV Injection ceftriaxone for 5 days and the limb was immobilized in an above knee slab for 3 weeks. Closed chain exercises of quadriceps and hamstring were started from the very next day of the procedure along with dynamic ankle pump exercises. Gentle mobilization of knee was started after suture removal with the above knee slab still applied, but the slab was enfeebled at the knee level by this time. After three weeks slab was removed. Patient was allowed partial weight bearing mobilization assisted with walker. Patient gained full movement of the knee at 2 months follow-up and was then allowed full weight bearing mobilization (figure 4). Patient was telephonically followed up till 1 year and did not have problem and was satisfied with the result.



Figure 2 preoperative clinical image



Figure 3 Intraoperative image showing two cuts in the bone indicating the wedge to be removed



Figure 4 post-operative X rays after 2 months showing callus at the osteotomy site with full corrected deformity

3. DISCUSSION

Though management of these deformities is a challenge for an orthopedic surgeon, several modalities are described for the same such as permanent epiphysiodesis, temporary hemi epiphysiodesis or growth modulation and corrective osteotomy. Skeletal maturity is a crucial factor in deciding the type of modality to be used. Emergence of the concept of epiphysiodesis for correction of these deformities played a transitional role in approach to the management (Koczewski and Fryzowicz, 2013). In this technique, one part of the epiphysis or growth plate is destroyed or restricted permanently while the other part of the plate is allowed to grow normally. This procedure over the time corrects the deformity. Later, percutaneous technique was introduced for restriction of growth plate which was less invasive; however, since these techniques lead to permanent damage to one part of growth plate, there was always a problem of under correction or over correction.

Later, due to the shortcomings of epiphysiodesis, the concept of temporary hemi epiphysiodesis was introduced. In this technique, instead of permanent restriction of growth plate, implants were used to temporarily restrict the growth of physis. Once implant removal was done, growth plate was able to grow normally. Hence, selection of appropriate time of operation was not problematic in hemi epiphysiodesis as in epiphysiodesis. These methods however are gradual methods and results are not achieved immediately after surgery. These are useful only in patients with immature skeleton and a high bone growth potential (Omidi-Kashani et al., 2009).

Another method for management of knee valgus is temporary hemi epiphysiodesis using eight plates. It is especially useful in young individuals with high growth capacity, however due to rebound phenomenon, slight overcorrection should be done. Osteotomy for correction can be done when skeleton becomes mature. They are of 2 types, closed wedge (Burton and Hennrikus, 2016), in which piece of bone is removed, and open wedge osteotomy (Griswold et al., 2018) in which piece of bone is inserted for correction of deformity. Correction can be acutely or gradually after the osteotomy. In acute correction, bone wedge can be grafted or removed. However, there are more chances of complications with acute correction than gradual correction.

In the present case, the patient was 13 years old and skeletally immature but the deformity was not progressing since the past 1 year. An acute closed wedge osteotomy was done over the medial aspect and fixation was done laterally without disturbing the growth epiphysis. The lower limb axis was restored while the obliquity line of knee joint was maintained. Complications associated with acute correction like knee stiffness and compartment syndrome were successfully avoided. Ding et al., (2019) and Naik and Shah, (2021) did gradual correction, timely distraction with external fixator application after performing osteotomy. As with any other surgical procedure, this technique can also lead to complications such as compartment syndrome, neurovascular injury, post operative pain and arthritis.

4. CONCLUSION

A case of genu valgus can be completely corrected with osteotomy and plate osteosynthesis when the progression of the disease stops with proper preoperative planning and assessment. The risk of recurrence of abnormality and need of another surgery should be well explained.

Acknowledgement

We thank the patient who contributed as the study sample.

Author Contributions

All the authors have contributed in case management and manuscript preparation.

Informed consent

Written & Oral informed consent was obtained from the patient's parents.

Funding

This study has not received any external funding.

Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

- Burton A, Hennrikus W. Complete Closing Wedge Osteotomy for Correction of Blount Disease (Tibia Vara): A Technique. *Am J Orthop* Belle Mead NJ 2016; 45(1):16-18.
- Ding J, Zhu T, Jin F chun, Wu Z kai, Li H. The effect of temporary hemiepiphysiodesis in the treatment of skeleton immature posttraumatic genu angular deformity: a retrospective study of 27 cases. *J Orthop Surg* 2019; 14:381. doi:10.1186/s13018-019-1426-0
- Dirk Zajonz, Eckehard Schumann, Magdalena Wojan, Fabian B. Kübler, Christoph Josten, Ulf Bühligen & Christoph E. Heyde. Treatment of genu valgum in children by means of temporary hemiepiphysiodesis using eight-plates: short-term findings. *BMC Musculoskelet Disord* 2017; 18(1):456. doi:10.1186/s12891-017-1823-7
- Greene WB. Genu varum and genu valgum in children. *Instr Course Lect* 1994; 43:151-159.
- Griswold B, Gilbert S, Khoury J. Opening Wedge Osteotomy for the Correction of Adolescent Tibia Vara. *Iowa Orthop J* 2018; 38:141-146.
- Koczewski P, Fryzowicz A. Phemister epiphysiodesis in leg length inequality treatment--evaluative outcome analysis. *Ortop Traumatol Rehabil* 2013; 15(4):315-323. doi:10.5604/15093492.1073830
- Kosashvili Y, Safir O, Gross A, Morag G, Lakstein D, Backstein D. Distal femoral varus osteotomy for lateral osteoarthritis of the knee: a minimum ten-year follow-up. *Int Orthop* 2010; 34(2):249-254. doi:10.1007/s00264-009-0807-0
- Naik AB, Shah DS. Two-level Osteotomy for Genu Valgum with Tibia Valga: Surgical Planning and Execution. *J Orthop Case Rep* 2021; 11(1):33-37. doi:10.13107/jocr.2021.v11.i01.1954
- Omidi-Kashani F, Hasankhani IG, Mazlumi M, Ebrahimzadeh MH. Varus distal femoral osteotomy in young adults with valgus knee. *J Orthop Surg* 2009; 4:15. doi:10.1186/1749-799X-4-15